CLAIM AMENDMENTS

Claims 1-22 (cancelled).

Claim 23 (new): A method for detecting a nucleic acid target sequence in a sample, comprising the steps: (a) formation of the nucleic acid target sequence; (b) formation of said 3' terminal labeled primer; (c) formation of primer extension mixture under primer extension reaction conditions; (d) subjection of said primer extension with polymerases; and (e) separation of said extended products with labels integrated from the extended products without labels and from the un-extended primers.

Claim 24 (new): The method, as recited in claim 23, wherein said nucleic acid target is DNA.

Claim 25 (new): The method, as recited in claim 23, wherein said nucleic acid target is RNA.

Claim 26 (new): The method, as recited in claim 23, wherein said nucleic acid target is *in vitro* transcribed cDNA.

Claim 27 (new): The method, as recited in claim 23, wherein said 3' terminal labeled primer is primer with free 3' hydroxyl group (-OH moiety) immediately available for primer extension.

Claim 28 (new): The method, as recited in claim 27, wherein said free 3' – OH moiety is specifically the dNMP.

Claim 29 (new): The method, as recited in claim 23, wherein said 3' terminal labeled primer is isotopic labeled.

Claim 30 (new): The method, as recited in claim 23, wherein said 3' terminal labeled primer is fluorescent labeled.

Claim 31 (new): The method, as recited in claim 23, wherein said 3' terminal labeled primer is antigenic moiety conjugated.

Claim 32 (new): The method, as recited in claim 23, wherein said 3' terminal labeled primer is enzymatic moiety conjugated.

Claim 33 (new): The method, as recited in claim 23, wherein said primer extension is a mono-directional primer extension.

Claim 34 (new): The method, as recited in claim 23, wherein said primer extension is a bi-directional primer extension.

Claim 35 (new): The method, as recited in claim 23, wherein said primer extension is solution-based primer extension.

Claim 36 (new): The method, as recited in claim 23, wherein said primer extension is semi-solid phased cascade primer extension.

Claim 37 (new): The method, as recited in claim 23, wherein said primer extension is solid-phase primer extension.

Claim 38 (new): The method according to claim 37, wherein said primer extension is post-hybridization primer extension.

Claim 39 (new): The method, as recited in claim 23, wherein said 3' labeled primer and the target sequence forms an extendable complex when the primer and target sequence are perfectly matched; the 3' terminal labeled primer is extended in primer extension by polymerases and the label is kept into the extended products.

Claim 40 (new): The method, as recited in claim 23, wherein said 3' labeled primer and the target sequence forms a complex subjected to digestion when the primer and target sequence are mismatched; the 3' terminal labeled primer is digested to primer without terminal label by polymerases and the digested primer is extended by polymerases yielding polynucleotide product without label.

Claim 41 (new): The method, as recited in claim 23, wherein said 3' labeled primer and the target sequence forms a complex resistant to extension when the primer and target sequence are mismatched; the 3' terminal labeled primer is kept intact and no polynucleotide products yielded from the mismatched complex.

Claim 42 (new): The method, as recited in claim 23, wherein said labels in products with labels integrated are separated from other labels by electrophoresis.

Claim 43 (new): The method, as recited in claim 23, wherein said labeled primers are digested by polymerase during primer extension.

Claim 44 (new): The method, as recited in claim 23, wherein said labeled primers are digested by S1 nuclease treatment after primer extension.